WHAT IS CLAIMED IS:

1. A pharmaceutical composition, comprising a mixture of alpha interferon polymer conjugate positional isomers, wherein one of said positional isomers comprises an alpha interferon covalently conjugated to a substantially non-antigenic polymer at a histidine residue on said alpha interferon.
2. The pharmaceutical composition of claim 1, wherein said alpha interferon is interferon alpha 2b.
3. The pharmaceutical composition of claim 2, wherein said histidine residue is His34.
4. The pharmaceutical composition of claim 1, wherein said mixture of said alpha interferon positional isomers comprises at least about 3 positional isomers.
5. The pharmaceutical composition of claim 4, wherein said mixture of said alpha interferon positional isomers comprises at least about 6 positional isomers.
6. The pharmaceutical composition of claim 5, wherein said mixture of said alpha interferon positional isomers comprises at least about 8 positional isomers.
7. The pharmaceutical composition of claim 6, wherein said alpha interferon is alpha interferon 2b and the positional isomers are selected from the group consisting of Cys1, Lys31, His34, Lys49, Lys83, Lys121, Lys131 and Lys134.
8. The pharmaceutical composition of claim 1, wherein said polymer comprises a polyalkylene oxide.
9. The pharmaceutical composition of claim 8, wherein said polyalkylene oxide is a polyethylene glycol.
10. The pharmaceutical composition of claim 8, wherein said polyalkylene oxide is a monomethoxy-polyethylene glycol, (mPEG).
11. The pharmaceutical composition of claim 1, wherein said substantially non-antigenic polymer has a molecular weight of from about 200 to about 35,000.
12. The pharmaceutical composition of claim 11, wherein said substantially non-antigenic polymer has a molecular weight of from about 1,000 to about 15,000.

12 ~~13~~. The pharmaceutical composition of claim 11 ~~12~~, wherein said substantially non-antigenic polymer has a molecular weight of from about 2,000 to about 12,500.

14. ~~The pharmaceutical composition of claim 1, wherein said polymer is selected~~ from the group consisting of polypropylene glycol, dextran, ~~polyvinyl~~ pyrrolidones, polyacryl amides, ~~polyvinyl alcohols~~ and carbohydrate-based polymers.

15. An alpha interferon-containing composition, comprising a plurality of alpha interferon polymer conjugates, wherein at least about 15% of the conjugates include covalent attachment of said substantially non-antigenic polymer at a ~~histidine of said alpha interferon.~~

15 ~~16~~. The composition of claim 14 ~~15~~, wherein the alpha interferon portion of said composition is alpha interferon 2b and said histidine is His34.

16 ~~17~~. The composition of claim 14 ~~15~~, wherein at least about 30 % of said conjugates include covalent attachment of said substantially non-antigenic polymer at histidine-34 of said alpha interferon.

17 ~~18~~. The composition of claim 16 ~~17~~, wherein at least about 40 % of said conjugates include covalent attachment of said substantially non-antigenic polymer at histidine-34 of said alpha interferon.

19. ~~A pharmaceutical composition, comprising a mixture of alpha~~ interferon 2b-polymer positional isomers, wherein from about 30 to about 60% of the positional isomers include a substantially non-antigenic polymer conjugated to the His34 of said alpha interferon, ~~from about 7~~ to about 20% of the positional isomers include ~~a substantially~~ non-antigenic polymer conjugated to the Cys1 of said alpha interferon and about 7 to about 15% of the positional isomers include a substantially non-antigenic polymer conjugated ~~to the Lys121 of said alpha interferon.~~

19 ~~20~~. The pharmaceutical composition of claim 18 ~~19~~, wherein about 55% of the positional isomers include a substantially non-antigenic polymer conjugated to the His34 of said alpha interferon, about 15% of the positional isomers include a substantially non-antigenic polymer conjugated to the Cys1 of said alpha

interferon and about 15% of the positional isomers include a substantially non-antigenic polymer conjugated to the Lys121 of said alpha interferon.

21. A method of preparing alpha-interferon conjugates, comprising contacting an alpha interferon with a sufficient amount of an oxycarbonyl-oxy-N-dicarboximide-activated substantially non-antigenic polymer under conditions which are sufficient to facilitate covalent attachment of said substantially non-antigenic polymer at a histidine of said alpha interferon.

22. The method of claim 20, wherein said oxycarbonyl-oxy-N-dicarboximide is succinimidyl carbonate.

23. The method of claim 20, wherein said conditions include conducting said contacting at a pH of less than about 7.0.

24. The method of claim 22, wherein said conditions include conducting said contacting at a pH of less than about 6.8.

25. The method of claim 23, wherein said conditions include conducting said contacting at a pH of from about 4.5 to about 6.8.

26. The method of claim 20, wherein said activated substantially non-antigenic polymer is present in a molar excess with respect to said alpha interferon.

27. The method of claim 26, wherein said polymer molar excess is from about 1 to about 8-fold.

28. The method of claim 27, wherein said polymer molar excess is from about 1.5 to about 7-fold.

29. The method of claim 27, wherein said polymer molar excess is about 1.75 to about 5-fold.

30. The method of claim 21, wherein said substantially non-antigenic polymer comprises a polyalkylene oxide.

31. The method of claim 30, wherein said polyalkylene oxide is a polyethylene glycol.

32. The method of claim 20, wherein said substantially non-antigenic polymer has a molecular weight of from about 200 to about 35,000.

33. The method of claim 32, wherein said substantially non-antigenic polymer has a molecular weight of from about 1,000 to about 15,000.

34. The method of claim 33, wherein said substantially non-antigenic polymer has a molecular weight of from about 2,000 to about 12,500.

35. The method of claim 21, wherein said alpha interferon is interferon alpha 2b.

36. A method of treating an interferon-susceptible condition in mammals, comprising administering an effective amount of a composition of claim 1.

37. A method of treating an interferon-susceptible condition in mammals, comprising administering an effective amount of a composition of claim 15.

38. A method of treating an interferon-susceptible condition in mammals, comprising administering an effective amount of a composition of claim 19.

39. A substantially non-antigenic polymer-interferon conjugate prepared according to the method of claim 21.